

CLAIMS

1. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

5 a radio transceiver;
 memory within said device that can contain data to be transmitted;
 said device operating in a master mode and being switchable between linkage and data communications modes;

 said device, when in linkage mode, sending out inquiry signals seeking
 10 communication with another device that shares the same communications protocol but in slave mode;

 said device exchanging addresses with another device that shares the same communications protocol but in slave mode and that responds to one of said inquiry signals and then switches into data communications mode;

15 said device thereafter retrieving from said memory any data that are to be transmitted, forming the data into error-correctable, addressed data packets, sending out the packets, and thereafter awaiting acknowledgment of successful receipt of such data, to transfer the data in an error free manner from it to another device that shares the same communications protocol.

2. A data processing device in accordance with claim 1 wherein the transceiver is designed to operate on at least two differing frequencies, with automatic provision for switching of communicating devices between frequencies, to minimize interference problems.

3. A data processing device in accordance with claim 1 wherein at least some transmitted packets are addressed using data derived from the address of at least one device.

4. A data processing device in accordance with claim 1 wherein said device, once having entered the data communications mode, sends out addressed send requests when no data are available to be transmitted, or packetized data when data are available to be transmitted.

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5. A data processing device in accordance with claim 4 wherein at least the transceiver portions of said device enter a low-power state at times between the generation of said send requests and packetized data.

6. A data processing device in accordance with claim 4 wherein, after sending out send requests or packetized data, said device awaits the return transmission of either an acknowledgment of data correctly received or packetized return data, which return data are placed into said memory preparatory to being utilized by said device.

7. A data processing device in accordance with claim 1 wherein said data processing device includes a bar code reader.

8. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

a radio transceiver;

a memory within said device that can accept received incoming data;

said device operating in a slave mode and being switchable between linkage and data communications modes;

said device, when in linkage mode, listening for and responding to any received inquiries from another device in linkage mode and in master mode that shares the same communications protocol, said device exchanging addresses with said another device and then said device switches into data communications mode; and

said device thereafter, storing in said memory any data that are received in the form of error-correctable, addressed data packets that arrive, and thereafter acknowledging successful or unsuccessful receipt of such data packets, to receive the data in an error free manner from another device that shares the same communications protocol but that operates in master mode.

9. A data processing device in accordance with claim 8 wherein the transceiver is designed to operate on at least two differing frequencies, with automatic switching of communicating devices between frequencies to minimize interference problems.

10. A data processing device in accordance with claim 8 wherein at least some transmitted packets are identified by data derived from the address of at least one device.

11. A data processing device in accordance with claim 8 wherein at least the transceiver portions of said device enter a low-power state at times between the times of occurrence of said incoming data packets and periodically power up to listen for incoming data packets.

12. A data processing device in accordance with claim 8 wherein said device, once having entered the data communications mode, listens for addressed send requests when no data are available to be transmitted from a master device, or for packetized data when data are available to be transmitted from a master device.

13. A data processing device in accordance with claim 11 wherein, after receiving a send request or a data packet, said device sends an acknowledgement of any data correctly received, or if its memory contains data to be sent out, an acknowledgment of data correctly received plus a packet of return data, which return data are retrieved from said memory preparatory to being transmitted.

14. A data processing device in accordance with claim 8 wherein said data processing device includes a printer.

15. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

a radio transceiver;

memory within said device that can contain data to be transmitted and that can accept received incoming data;

said device operating in a master mode and being switchable between linkage and data communications modes;

said device, when in linkage mode, sending out inquiry signals seeking communication with another device that shares the same communications protocol but in slave mode;

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said device exchanging addresses with another device that shares the same communications protocol but in slave mode and that responds to one of said inquiry signals and then switches into data communications mode;

- 15 said device thereafter retrieving from said memory any data that are to be transmitted and transmitting said data in the form of packetized, error-correctable, addressed data packets, and thereafter awaiting acknowledgment of successful receipt of such data or awaiting acknowledgment plus a packet of return data, which return data are placed into said memory, to transfer data in an error free manner between it and another
- 20 device that shares the same communications protocol but in slave mode.

16. A data processing device in accordance with claim 15 wherein the transceiver is designed to operate on at least two differing frequencies, with provision for automatic switching of communicating devices between frequencies, to minimize interference problems.

17. A data processing device in accordance with claim 15 wherein at least some transmitted packets are identified by data derived from the address of at least one device.

18. A data processing device in accordance with claim 15 wherein said device, once having entered the data communications mode, sends out addressed send requests when no data are available to be transmitted, thereafter listening for incoming data packets.

19. A data processing device in accordance with claim 18 wherein at least the transceiver portions of said device enter a low-power state at times between the generation of said send requests and when no data packets are being sent or received.

20. A data processing device in accordance with claim 15 wherein said data processing device includes a bar code reader.

21. A data processing device in accordance with claim 15 wherein said data processing device includes a printer.

22. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

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a radio transceiver;

5 memory within said device that can contain data to be transmitted and accept received incoming data;

said device operating in a slave mode and being switchable between linkage and data communications modes;

10 said device, when in linkage mode, listening for and responding to any received inquiries from another device that shares the same communications protocol and that is in master mode, said device exchanging addresses with said another device and then switches into data communications mode; and

15 said device thereafter, in response to incoming data packets or send requests, accepts and places into said memory any data in said data packets and acknowledges receipt of any such data received and, if there are any data to transmit, retrieves from said memory the data that are to be transmitted and transmitting said data, where all such data are in the form of error-correctable, addressed data packets that are sent and acknowledged when successfully received, to transfer the data in an error free manner between it and another device that shares the same communications protocol but in master mode.

23. A data processing device in accordance with claim 22 wherein the transceiver is designed to operate on at least two differing frequencies, with provision for automatic switching of communicating devices between frequencies, to minimize interference problems.

24. A data processing device in accordance with claim 22 wherein at least some transmitted packets contain addresses derived from the address of at least one device.

25. A data processing device in accordance with claim 22 wherein at least the transceiver portions of said device enter a low-power state at times between the arrival of said incoming data packets and send requests when no data are to be transmitted or received, and periodically power up to listen for incoming data packets.

26. A data processing device in accordance with claim 22 wherein said data processing device includes a bar code reader.

27. A data processing device in accordance with claim 22 wherein said data processing device includes a printer.

28. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

a radio transceiver;

a memory within said device that can contain data to be transmitted;

said device operating in a slave mode and being switchable between linkage and data communications modes;

said device, when in linkage mode, listening for and responding to any received inquiries from another device that shares the same communications protocol and that is in master mode, exchanging addresses with said another device and then switching into data communications mode; and

said device thereafter, in response to send requests, retrieves from said memory any data that are to be transmitted in the form of error-correctable, addressed data packets which are sent out following receipt of said send requests, and thereafter awaits acknowledgment of successful receipt of such data, to transfer the data in an error free manner between devices that share the same communications protocol.

29. A data processing device in accordance with claim 28 wherein the transceiver is designed to operate on at least two differing frequencies, with provision for automatic switching of communicating devices between frequencies to minimize interference problems.

30. A data processing device in accordance with claim 28 wherein at least some transmitted packets contain addresses derived from the address of at least one device.

31. A data processing device in accordance with claim 28 wherein said device, once having entered the data communications mode, can receive either send requests, when no incoming data have been sent, or packets of data, when incoming data are available and have been sent, and wherein said device stores said incoming data in said memory.

32. A data processing device in accordance with claim 31 wherein at least the transceiver portions of said device enter a low-power state at times between the receipt of incoming commands when no data are being transferred.

33. A data processing device in accordance with claim 28 wherein said data processing device includes a printer.

34. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

a radio transceiver;

memory within said device that can accept received incoming data;

said device operating in a master mode and being switchable between linkage and data communications modes;

said device, when in linkage mode, sending out inquiry signals seeking communication with another device that shares the same communications protocol but in slave mode;

said device exchanging addresses with another device that shares the same communications protocol and but in slave mode that responds to such inquiry signals and then switching into data communications mode;

said device thereafter sending out addressed periodic send requests and, in return, sometimes receiving back data in the form of error-correctable, addressed data packets that said device stores in said memory, said device acknowledging the successful receipt of such data, to transfer data in an error free manner from another device that shares the same communications protocol but in slave mode.

35. A data processing device in accordance with claim 34 wherein the transceiver is designed to operate on at least two differing frequencies, with provision for automatic switching of communicating devices between frequencies, to minimize interference problems.

36. A data processing device in accordance with claim 34 wherein at least some received packets contain addresses derived from the address of at least one device.

37. A data processing device in accordance with claim 34 wherein said device, once having entered the data communications mode, sends out addressed periodic send requests, when no data are available to be transmitted, or packets of data retrieved from said memory when data are available to be transmitted.

38. A data processing device in accordance with claim 34 wherein at least the transceiver portions of said device enter a low-power state at times between the generation of said periodic send requests, when no data are being transferred.

39. A data processing device in accordance with claim 34 wherein said data processing device includes a printer.

40. A data processing device that can establish and maintain a wireless communication link between itself and another nearby data processing device which shares the same communications protocol, said device comprising:

a radio transceiver;

memory within said device that can contain data to be transmitted and that can accept received incoming data;

said device capable of operating in either master or slave mode, and being switchable between linkage and data communications modes;

said device, when in linkage mode and master mode, sending out inquiry signals seeking communication with another device that shares the same communications protocol when in slave mode;

said device, when in linkage mode and slave mode, listening for and responding to any received inquiry signals from another device that shares the same communications protocol but in master mode;

said device, when in linkage and master mode, exchanges addresses with another device that shares the same communications protocol but in slave mode and that responds to such inquiry signals, and then switches into data communications mode;

said device, when in linkage and slave mode, exchanges addresses with another device that shares the same communications protocol but in master mode and from which the device receives an inquiry, and then switches into data communications mode; and

said device, when in master mode and data communications mode, sends out send requests or, when the memory contains data that are to be transmitted, retrieves from said memory such data that are to be transmitted and sends the data in the form of error-correctable, addressed data packets, and thereafter said device awaits

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acknowledgment of the successful receipt of any such data, or the receipt back of incoming error-correctable, addressed data packets; and

30 said device, when in slave mode and data communications mode, awaiting incoming error-correctable, addressed data packets or send requests and responds by accepting any data in said memory and sending out an acknowledgment of any incoming data and, if there is data to transmit, by sending out outgoing error-correctable, addressed data packets and awaiting acknowledgment.

41. A data processing device in accordance with claim 40 wherein the transceiver is designed to operate on at least two differing frequencies, with provision for automatic switching of communicating devices between frequencies, to minimize interference problems.

42. A data processing device in accordance with claim 40 wherein at least some transmitted packets contain addresses derived from the address of at least one device.

43. A data processing device in accordance with claim 40 wherein at least the transceiver portions of said device enter a low-power state at times between the generation and receipt of said send requests at times when no data are being transmitted or received.

44. A data processing device in accordance with claim 40 wherein said data processing device includes a bar code reader.

45. A data processing device in accordance with claim 40 wherein said data processing device includes a printer.

46. A method for conducting wireless communication between a source and sink for data comprising the steps of:

placing both said source and said sink into a first linkage mode;

5 defining one of said source and sink to be the master and defining the other to be the slave;

having the master send out inquiry signal pulses seeking a response from the slave;

having the slave, in response to receipt of such a signal pulse, send back a responsive signal pulse;

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- 10 having the master and slave exchange addresses and thereafter both switch
into a second data communications mode;
- having the master send out send requests;
- having the slave send out a signal responsive to at least some of said send
requests;
- 15 having the source send data in place of at least some of its send requests, if it
is the master, or with at least some of its responsive signals, if it is the slave;
- having the sink receive data from any responsive signal containing data, if it
is the master, or replacing any send requests, if it is the slave; and
- formulating any data transmitted and received into error-correctable,
20 addressed data packets, to thereby transfer data in an error-free manner.
47. A method in accordance with claim 46 which further includes provision
for transmission of at least some data back from the sink to the source following the
protocols described for transmission from the source to the sink.
48. A method in accordance with claim 46 wherein at least some the data
transferred is descriptive of bar code information.
49. A method in accordance with claim 46 including the step of printing at
least some of the information reaching the sink.
50. \int A unit, configurable as a master or slave, and installable in a data
processing device, for enabling that device to communicate with another device containing
a compatible device configured in the opposite master or slave state, said unit comprising:
- a transceiver;
- 5 a control placing said device first into a linkage state to seek out a
compatible unit and thereafter into a data communications state to communicate with a
compatible unit once one is found;
- a first mechanism within said unit when in said linkage state that sends out,
if configured as a master, or that listens for and receives, if configured as a slave, inquiry
10 signals, and that sends out, if configured as a slave, or receives, if configured as a master,
an acknowledgment signal acknowledging receipt of any such inquiry signal that is
successfully sent and received, and in either case, after interchanging inquiry and

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acknowledgment signals and exchanging addresses that places said unit into its data communications state;

- 15 a second mechanism within said unit when in said data communications state that causes said unit, if configured as a master, to send out send requests or data to be transmitted, or if configured as a slave, to acknowledge any data received by sending back an acknowledgment accompanied by any data to be transmitted, and in either case that accepts and acknowledges any incoming data, organizing said data sent or received into
- 20 addressed, error-correctable data packets, to thereby transfer data in an error-free manner between said device and another device.

51. A unit in accordance with claim 50 wherein said unit powers itself down when no data are being transferred and no send requests are being sent or acknowledgment signals are expected.

52. A unit in accordance with claim 50 wherein said transceiver can operate on at least two different frequencies and wherein said unit, in its data communications state, can change frequencies in synchronism with another unit with which it communicates to minimize interference problems.

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